Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (currently amended) An electronic valve actuator, comprising:

an electromagnet;

an armature disposed adjacent to the electromagnet;

a fluid-containing chamber having:

a first piston providing a first wall portion of the chamber, such first piston being movable in the chamber along a direction of motion, such first wall portion having a first projected surface area, such first projected surface area being the surface area of the first wall portion projected onto a plane normal to the direction of motion of the first piston; and

a second piston providing a second wall portion of the chamber, such second piston being movable in the chamber along a direction of motion, such second wall portion having a second projected surface area, such second projected surface area being the surface area of the second wall portion projected onto a plane normal to the direction of motion of the second piston, the first projected wall portion being ~~having a~~ different ~~greater surface area than~~ from the second projected surface area ~~of the second wall portion~~; and

wherein the first piston is coupled to the armature and the second piston is coupled to a valve.

2. (original) The electronic valve actuator recited in claim 1 wherein the valve is a valve of an internal combustion engine.

3. (original) The electronic valve actuator recited in claim 2 wherein the chamber has therein motor oil for the engine.

4. (currently amended) An electronic valve actuator, comprising:

a pair of electromagnets;

an armature disposed in a magnetic field produced by the pair of electromagnets;

a fluid-containing chamber having:

a first piston providing a first wall portion of the chamber, such first piston being movable in the chamber along a direction of motion, such first wall portion having a first projected surface area, such first projected surface area being the surface area of the first wall portion projected onto a plane normal to the direction of motion of the first piston; and

a second piston providing a second wall portion of the chamber, such second piston being movable in the chamber along a direction of motion, such second wall portion having a second projected surface area, such second projected surface area being the surface area of the second wall portion projected onto a plane normal to the direction of motion of the second piston, the first projected surface area being different from ~~wall portion having a greater surface area than~~ the second projected surface area ~~of the second wall portion~~; and

wherein the first piston is coupled to the armature and the second piston is coupled to a valve;

a pair of springs, a first one of the pair of springs is disposed to compress upon activation of a first one of the pair of electromagnets while a second one of such pair of springs is disposed to expand upon such activation of the first one of the pair of electromagnets, the first one of the springs being held in compression until deactivation of the first one of the electromagnets, the second one of the pair of springs being disposed to compress after deactivation of the first one of the electromagnets and resulting expansion of the first one of the pair of springs while the first one of such pair of springs is disposed to thereby expand, the second one of the springs being held in compression until deactivation of

the second one of the electromagnets.

5. (original) The electronic valve actuator recited in claim 1 including a valve disposed in the wall of the fluid-containing chamber for enabling such chamber to receive fluid when volume of such chamber is increased by activation of one of electromagnets to move one of the pistons in a first direction and to inhibit removal of such fluid from the chamber when volume of such chamber is decreased by activation of said one of the pistons in an opposite direction.

6. (original) The electronic valve actuator recited in claim 4 including a valve disposed in the wall of the fluid-containing chamber for enabling such chamber to receive fluid when volume of such chamber is increased by activation of one of electromagnets to move one of the pistons in a first direction and to inhibit removal of such fluid from the chamber when volume of such chamber is decreased by activation of said one of the pistons in an opposite direction.

7. (original) The electronic valve actuator recited in claim 6 including a second fluid-containing chamber providing a conduit for fluid therein to pass between an outer surface portion of the first piston and an outer surface portion of the second piston as the first and second pistons move in response to activation of the first and second ones of the pair of electromagnets.

8. (original) The electronic valve actuator recited in claim 6 wherein the fluid in the second chamber passes to the first-mentioned fluid-containing chamber through the valve.

9. (currently amended) An electronic valve actuator, comprising:
an electromagnet;
an armature disposed adjacent to the electromagnet;

a fluid-containing chamber having:

a first piston providing a first wall portion of the chamber, such first piston being movable in the chamber along a direction of motion, such first wall portion having a first projected surface area, such first projected surface area being the surface area of the first wall portion projected onto a plane normal to the direction of motion of the first piston; and

a second piston, spaced from the first piston, providing a second wall portion of the chamber, such second piston being movable in the chamber along a direction of motion, such second wall portion having a second projected surface area, such second projected surface area being the surface area of the second wall portion projected onto a plane normal to the direction of motion of the second piston, the first projected surface area being different from, ~~wall portion having a greater surface area than~~ the second projected surface area ~~of the second wall portion~~;

wherein the first piston is coupled to the armature and the second piston is coupled to a valve; and

wherein motion of the first piston is coupled to the second piston through fluid in the fluid-containing chamber.

10. (previously presented) The electronic valve actuator recited in claim 9 wherein the valve is a valve of an internal combustion engine.

11. (previously presented) The electronic valve actuator recited in claim 10 wherein the chamber has therein motor oil for the engine.

12. (currently amended) An electronic valve actuator, comprising:

a pair of electromagnets;

an armature disposed in a magnetic field produced by the pair of electromagnets;

a fluid-containing chamber having:

a first piston providing a first wall portion of the chamber, such first piston being movable in the chamber along a direction of motion, such first wall portion having a first projected surface area, such first projected surface area being the surface area of the first wall portion projected onto a plane normal to the direction of motion of the first piston; and

a second piston, spaced from the first piston, providing a second wall portion of the chamber, such second piston being movable in the chamber along a direction of motion, such second wall portion having a second projected surface area, such second projected surface area being the surface area of the second wall portion projected onto a plane normal to the direction of motion of the second piston, the first projected surface area ~~wall portion having a~~ being different from ~~greater surface area than~~ the second projected surface area ~~of the second wall portion~~;

wherein the first piston is coupled to the armature and the second piston is coupled to a valve; and

wherein motion of the first piston is coupled to the second piston through fluid in the fluid-containing chamber;

a pair of springs, a first one of the pair of springs is disposed to compress upon activation of a first one of the pair of electromagnets while a second one of such pair of springs is disposed to expand upon such activation of the first one of the pair of electromagnets, the first one of the springs being held in compression until deactivation of the first one of the electromagnets, the second one of the pair of springs being disposed to compress after deactivation of the first one of the electromagnets and resulting expansion of the first one of the pair of springs while the first one of such pair of springs is disposed to thereby expand, the second one of the springs being held in compression until deactivation of the second one of the electromagnets.

13. (previously presented) The electronic valve actuator recited in claim 9 including a valve disposed in the wall of the fluid-containing chamber for enabling such chamber to receive fluid when volume of such chamber is increased by activation of one of

electromagnets to move one of the pistons in a first direction and to inhibit removal of such fluid from the chamber when volume of such chamber is decreased by activation of said one of the pistons in an opposite direction.

14. (previously presented) The electronic valve actuator recited in claim 12 including a valve disposed in the wall of the fluid-containing chamber for enabling such chamber to receive fluid when volume of such chamber is increased by activation of one of electromagnets to move one of the pistons in a first direction and to inhibit removal of such fluid from the chamber when volume of such chamber is decreased by activation of said one of the pistons in an opposite direction.

15. (previously presented) The electronic valve actuator recited in claim 14 including a second fluid-containing chamber providing a conduit for fluid therein to pass between an outer surface portion of the first piston and an outer surface portion of the second piston as the first and second pistons move in response to activation of the first and second ones of the pair of electromagnets.

16. (previously presented) The electronic valve actuator recited in claim 15 wherein the fluid in the second chamber passes to the first-mentioned fluid-containing chamber through the valve.